



Shared Spectrum Company

Presentation to FCC on
National Broadband Plan Initiatives

10 August 2010

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Proposed Agenda

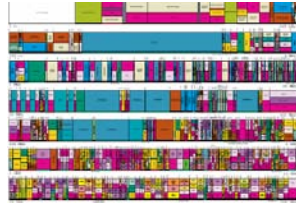
- Background/Update
 - SSC's Dynamic Spectrum Access (DSA) Technology
- Key Spectrum Initiatives from National Broadband Plan & President's Memo
 - Spectrum Inventory/Dashboard & Measurements
 - TV White Spaces Recon. Proceeding
 - 500 MHz Goal
 - "Opportunistic" Use of Spectrum
 - Secondary Markets Review

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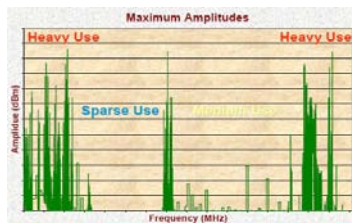


What is DSA Technology?

All spectrum may be allocated and assigned, but ...

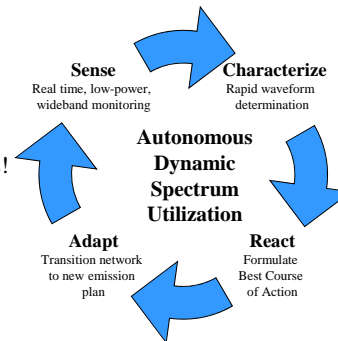


... Most spectrum is unused, especially in rural areas!



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SSC developed very smart radio technology and systems that allow users to dynamically and affordably access all available and authorized spectrum resources.



Result: 10-100x Increase in Spectrum Efficiency



Benefits of DSA

CRITICAL TO RURAL BROADBAND DEPLOYMENT

- Efficiently and safely use available spectrum in lower (VHF/UHF) frequency bands to increase link range
- Reduce propagation loss by selecting “best” frequency (building penetration, foliage attenuation)
- Reduce hardware costs
- Enable robust spectrum pooling with peer users
- Avoid intended/unintended interference
- High communication availability and reliability

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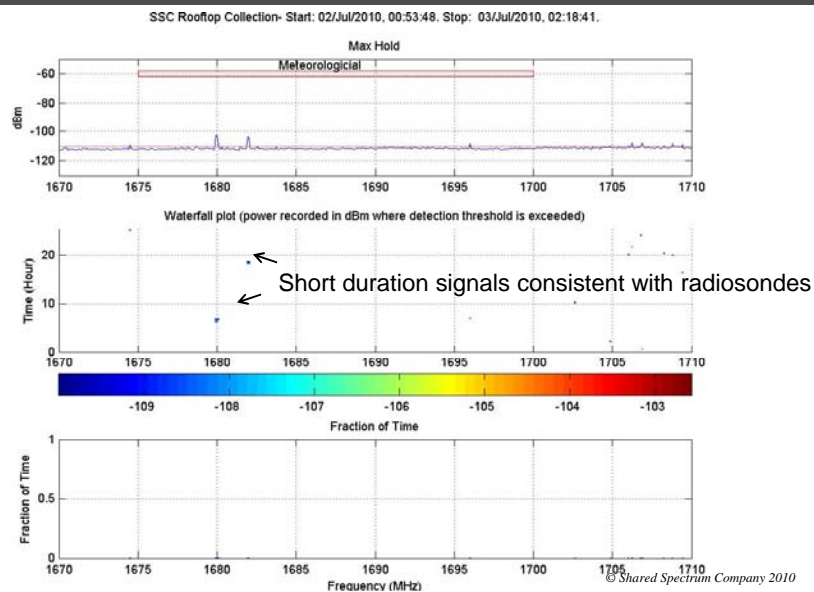
Spectrum Inventory

- Spectrum Dashboard
 - Integrated database will help drive new advanced wireless technologies, such as DSA
 - Future-proof system: back-end flexibility and scalability with front-end adaptability
 - Info for interference & spectrum sharing analysis (NTIA CSMAC Report)
- Spectrum Occupancy Measurements
 - Validate licensing data/analysis (next slide 1675-1710)
 - ID bands w/ lowest utilization in urban areas
 - General survey of all bands/all locations too costly

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1675-1710 MHz Meteorological Band





TV White Spaces Recon.

- Retain sensing requirement, at least as alternative to geolocation
 - Elimination will impact deployment of un-tethered/ad-hoc nets
 - Sensing data will provide valuable, independent check
- Remove additional procedural/substantive burdens on sensing-only personal/portable devices
 - Keeping discriminatory burdens will chill innovation/investment
 - All TVBDs/DBs should be subject to transparent certification process
- Facilitate deployment of TVBDs by DTV stations
 - “ancillary or supplementary services” per Section 336(a)(2)
 - Flexible co/adjacent-channel operational requirements
 - Enable implementation of return paths for new interactive/mobile video/broadband services
- Repacking of TV band still feasible if TVBDs reconfigurable

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500 MHz Goal

- Key Concepts/Principles to Get There
 - Multi-purposing instead of Re-purposing
 - Shared access and Exclusive use
 - ≠ unlicensed vs. licensed
 - Shared bands can be auctioned (*e.g.*, 1710-1755)
 - Paired vs. Unpaired vs. Fungible
 - Federal Bands under consideration:
 - 1675-1710 MHz
 - 1755-1780/1850 MHz
 - Others (*e.g.*, 3500-3650, 4200-4220, 4380-4400 MHz)
 - Incentives?

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Spectrum Sharing/“Opportunistic” Use

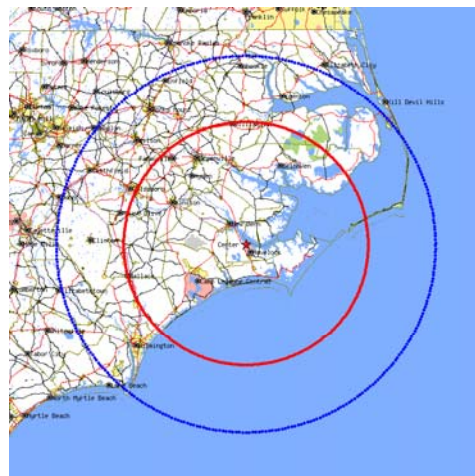
- DSA/Spectrum Sharing Technology Enables:
 - Cooperative Sharing (*e.g.*, secondary markets, leasing from Feds)
 - “Opportunistic” Use in vacant bands (*e.g.*, white spaces, auction left-overs, un-assigned Federal bands)
 - Potential non-cooperative, forced sharing, but only after years of experience with other dynamic sharing approaches
 - New “policy”-based regulatory framework
 - Reconfiguration capabilities avoid previous (and ongoing) sharing issues (*e.g.*, 5.8 GHz FAA Radars)
 - Based on establishing minimum hardware/software capabilities for devices in shared bands
 - Flexible operating parameters are reconfigurable due to changing circumstances over long-term, short-term and in real-time (depending on protected systems)
 - Standards development already underway (IEEE SCC-41: P1900.5 & P1900.6)
 - Enforcement of Interference Avoidance Rules

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Spectrum Sharing Use Case

- Section 27.1134 of FCC’s rules requires licensees in 1710–1755 MHz AWS band to protect DoD systems at Yuma & Cherry Point indefinitely.
- AWS licensees must accept any interference received from these facilities and must protect DoD facilities from interference.
- Cherry Point Example →
 - Red Circle: Protection Radii
 - Blue Circle: Coordination Radii (affects access to Wilmington, NC, Outer Banks & I-95)
- No incentive to coordinate/share in accordance with rules
- Applies to potential future bands



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Secondary Markets Review

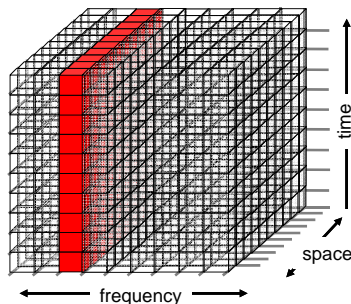
- Dashboard: Improve access to info (e.g., pre-filed Form 608)
- Facilitate better understanding of market/economic forces (e.g., as part of CMRS competition analysis)
- Clarify/modify service rules to provide incentives to lease (e.g., build-out rules)
- Provide enhanced incentives for licensees to (a) pool spectrum among themselves (e.g., distributed antenna systems; shared infrastructure); (b) lease to new entrants, rural broadband providers and those using advanced technologies like DSA (e.g., grant flexible use rights); and (c) establish “private commons”
- Harmonize flexible allocations/technical rules so that DSA and cognitive radio technologies can operate seamlessly across multiple bands/services (e.g., in-band/out-of-band power limits; require transmit power control to limit operating power to minimum necessary for successful communication)
- Expand applicability of Secondary Markets Policies to all spectrum-based services (i.e., broadcasting, all satellite)

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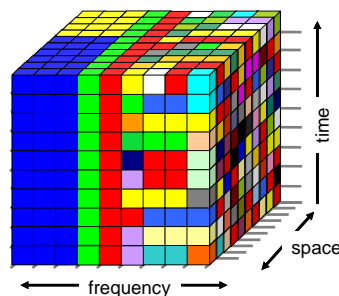


The Power of DSA & Secondary Markets

Dramatically improve efficiency and access across multiple dimensions



Without DSA/Leasing



With DSA & Robust Secondary Markets

Figures courtesy of Tim Forde, Trinity College, Dublin (<http://www.ctvr.ie/en/pages/pubs/TowardsAFluidSpectrumMarket.pdf>)